

AN
INAUGURAL DISSERTATION,
ON THE
CHEMICAL AND MEDICAL PROPERTIES
OF THE
PERSIMMON TREE,
AND THE
ANALYSIS of ASTRINGENT VEGETABLES;
SUBMITTED TO THE EXAMINATION
OF THE
REVD. JOHN EWING, S. T. P. PROVOST;
THE
TRUSTEES AND MEDICAL PROFESSORS,
OF THE
UNIVERSITY OF PENNSYLVANIA,
FOR THE DEGREE OF DOCTOR OF MEDICINE.

By JAMES WOODHOUSE, A M.

Honorary member of the American and Philadelphia Medical Societies.

*Full many a flower is born to blush unseen,
And waste its sweetness on the desert air.*

GRAY.

PHILADELPHIA:
PRINTED BY WILLIAM WOODHOUSE.

TO
BENJAMIN RUSH, M. D.
PROFESSOR OF THE INSTITUTES,
AND OF
CLINICAL MEDICINE,
IN THE
UNIVERSITY OF PENNSYLVANIA, &c.

This DISSERTATION
Is DEDICATED,
AS A GRATEFUL TRIBUTE OF RESPECT,
FROM HIS
AFFECTIONATE PUPIL,

THE AUTHOR.

To Mr. JAMES WOODHOUSE.

My dear friend,

I beg you would permit me, to make use of a small part of a page, of your intended inaugural publication, on the PERSIMMON TREE, and the Analysis of astringent vegetables, as the vehicle of my acknowledgements, of the great pleasure I derived, from witnessing the zeal and industry, with which you conducted the experiments and studies, that have led you to the valuable discoveries, contained in your dissertation.

I hope your success, in those experiments, will animate you to direct your inquiries into other branches of Chemistry and Medicine, and that your eminence and usefulness in life, may be equal to the ability and integrity with which you have discharged your duty to your

affectionate Preceptor,

BENJAMIN RUSH.

May 3rd. 1792.

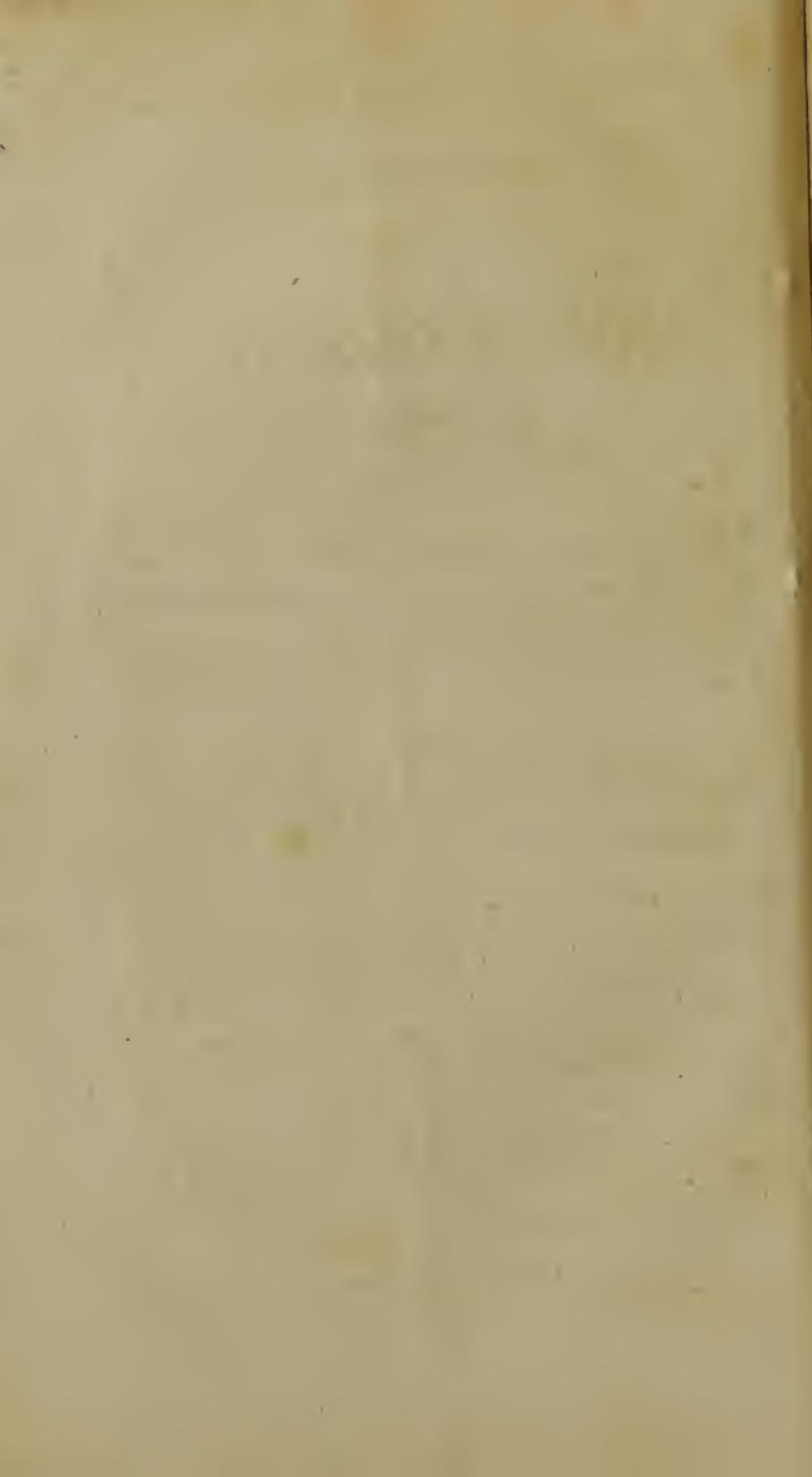
INTRODUCTION.

THREE are three things, says a celebrated writer, which are sufficient to render the best discourse, insipid and uninteresting ; the difficulty of the subject, the necessity of saying something, and the anxiety of saying it well.

Called before the tribunal of the public, under these circumstances, I feel the force of this observation in a peculiar manner.

I have chosen the Persimmon tree for an inaugural dissertation, on the one hand, merely to avoid a thread-bare worn out subject, and on the other, that I might have an opportunity of saying something on a tree, of which, little more is known than the name.

The indulgent reader will make every possible allowance, especially when he considers, that this thesis is the production of one, who is as yet, a Tyro in Chemistry.



HISTORY OF THE PERSIMMON TREE, &c.

LINNÆUS has placed the Persimmon tree, among the Polygamia Dioecia, and describes it in the following manner in his *Genera Plantarum*.

The *Hermaphrodite* female.

The *Calyx* is a *perianthium* of one leaf, four-cleft, large, obtuse and permanent.

The *Corolla* is composed of one petal, pitcher-shape, larger and four-cleft; the divisions acute and spreading.

The *Filaments* are eight, bristly, short and lightly inserted in the receptacle. The *Antheræ* are oblong and effæte.

The *Germen* is roundish. The *Style* one, half four-cleft, permanent and longer than the stamina. The *Stigmas* are obtuse and two-cleft.

The *Pericarpium* is a globous berry, large, eight-cell'd, and sitting on the large spreading calyx.

The *Seeds* are solitary, roundish, compressed, and very hard.

The *Male* in distinct plants.

The *Calyx* is a *perianthium* of one leaf, four-cleft, acute, erect and small.

The *Corolla* consists of one petal, pitcher-shape, coriaceous, four cornered and four-cleft: the divisions roundish and revolute.

The *Filaments* are eight, very short and inserted in the receptacle. The *Antheræ* are double, long and acute; the interior shortest.

The *Pistillum* is the rudiment of a germen.

The *species* with us but one.

The *DIOSPYROS VIRGINIANA*, *American Prune, Date Plum or Persimmon tree*, is of a rapid growth, rises from fourteen to twenty five feet in height, and bears fruit in a few years after it is planted.

It grows in Pennsylvania, New-Jersey, New-York, Maryland, Virginia, North Carolina, South Carolina and Georgia, in moist clayey ground, in swamps, and along the banks of rivers.

A number of short branches are sent out from the body of the tree, garnished with entire, oblong, pointed leaves; the blossoms are produced in April, growing along the sides of the branches, on very short foot-stalks, making but little appearance, and are succeeded by large globular or oblong fruit, of different sizes on different trees *.

The wood of the tree has a firm, close grain, burns well, and its ashes yield a large proportion of salts. The bark of the tree possesses a considerable degree of astrin-

* *Marshall's Arbutum Americanum*, and *Catesby's history of Carolina*, vol. 2nd.

gency, the leaves more than the bark, the bark more than the heart of the tree, and the unripe fruit is one of the most powerful astringents, in the vegetable kingdom.

The trunk of the tree does not exceed ten feet, the fruit contains four flat stones, which when split in two, Mr. Catesby says, exhibits the tree in embryo, with its stem or trunk, and two *folia seminalia* in a more conspicuous manner, than in any other seed he has ever met with.

A fine transparent gum, of a light brown color, insipid to the taste, readily soluble in water, exudes from the body of the tree.

A premium of twenty pounds sterling, was offered by a society in London, for the promotion of arts and manufactures, for a quantity of this gum, not less than fifty pounds, and a premium of ten pounds, for the next greatest quantity, not less than twenty five pounds.

The expressed juice of the unripe fruit, being a substance of a singular nature, was subjected to the following experiments.

EXPERIMENT I.

Distilled in a retort with a gentle heat, a quantity of water, of a disagreeable smell, came over into the receiver, which did not precipitate the liver of sulphur, had no effect on the solutions of iron, and did not change the blue color of vegetable substances. The fire being raised, I obtained an acid of a light yellow color, which precipitated corrosive sublimate of an orange color, green vitriol black, liver of sulphur white, and changed the tincture of lit-

mus to a bright red. A black friable matter remained in the retort, which possessed the properties of the acid in a small degree, and when burned to ashes in the open air, gave the earth of alum.

EXPERIMENT II.

One drop of the unripe juice, dropped in a gallon of rain water, in which one grain of green vitriol was dissolved, produced a purple color in the liquor.

EXPERIMENT III.

Iron filings digested in the unripe juice, ~~were~~ changed to the consistence of a paste, upon approaching a candle to the mouth of the matras, in which the experiment was made, a loud explosion took place.

EXPERIMENT IV.

Mixt with common spirit, it forms a jelly, with the spirit of sal ammoniac, it forms a coagulum of the consistence of soft soap.

EXPERIMENT V.

Inspissated in the sun, it yields a large quantity of a brown, transparent, astringent gummy substance, of which common spirit dissolves a larger quantity, than spirit of wine, or the vegetable oils. Pure Æther has no action upon it. Spirit of wine extracts the virtues of that part, which is insoluble in water.

EXPERIMENT VI.

The insoluble part of this substance, suspended in water, appears like a jelly, collected, dried and distilled, it yields water, acid, oil and fixed air.

EXPERIMENT VII.

The soluble and insoluble parts, separately boiled in the nitrous acid, yields long prismatic chrystals, which possess the same properties, as the acid obtained from saccharine substances, and which has improperly been named the acid of sugar.

EXPERIMENT VIII.

A quantity of the black succulent matter, precipitated from green vitriol, by the astringent juice, was collected, dried, and found to possess the following properties.

It undergoes no alteration from being exposed to the action of the air, for twelve months. Exposed to a bright red heat, it does not inflame, but burns like the calces of metals, and is reduced to its metallic form. Digested in a solution, of the mild or caustic vegetable alkali, or the mild and caustic volatile alkali, it tinges the liquor of a dirty brown color, which mixed with a solution of green vitriol, precipitates the iron, of a brown or purple color.

EXPERIMENT IX.

The unripe juice, spread with a feather, over an ancient decayed writing, restored the legibility of the letters, which instantly appeared of a deep black color.

EXPERIMENT X..

The vegetable and volatile alkalies, added to the unripe juice, formed a coagulum, which being several times washed in warm water, did not taste astringent; was insoluble in water and spirit of wine, but readily dissolved, in weak vitriolic acid.

EXPERIMENT XI.

The vegetable and volatile alkalies, were added to the unripe juice, diluted with water, and the mixture filtered: upon adding the vitriolic acid, in small quantities, to the filtered liquor, a precipitate took place, which remained suspended in the liquor; upon increasing the quantity of acid, the precipitate was redissolved with effervescence. The precipitate collected and dried, was not liquefiable by heat, was insoluble in water, but dissolved in spirit of wine.

EXPERIMENT XII.

The vegetable and volatile alkalies, added to the unripe juice, diluted with water, and the mixture filtered, and added to a solution of corrosive sublimate, green vitriol, and muriated barytes, precipitated the iron, the ponderous earth, and the mercury, entangled in the resin, which could be seen in the fluid in large transparent globules.

EXPERIMENT XIII.

An aqueous solution of Persimmon gum, and an acid solution of green vitriol, being mixed together, were transparent, upon adding the vegetable alkali, a black precipitate took place, which was instantly redissolved, by adding a greater quantity of the alkali, the precipitate remained suspended in the liquor; still continuing to increase the quantity of alkali, the black color of the precipitate was changed to a dirty brown.

The same effect was produced, when volatile alkali, magnesia, lime, or the earth of alum, were used instead of the vegetable alkali.

EXPERIMENT XIV.

The precipitate of muriated barytes, in the twelfth experiment, was collected by filtering the mother water, when added to a solution of green vitriol, the iron was precipitated black. Upon adding the vitriolic acid, to the filtered liquor, no precipitate took place.

EXPERIMENT XV.

The coagulum formed by the vegetable alkali, and unripe juice, being several times washed in water, was dissolved in the vitriolic acid, to which a small quantity of the vegetable alkali was added, to favour the crystallization. The solution, by spontaneous evaporation in the open air, gave crystals of alum, acid of sugar, and vitriolated tartar.

EXPERIMENT XVI.

The crystals of alum were collected, and dissolved in water, the vegetable and volatile alkalies, lime water, magnesia, ponderous earth, and a solution of borax precipitated its base.

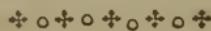
EXPERIMENT XVII.

The earth obtained from alum, by the vegetable alkali, was dissolved in the acid distilled from the Persimmon, and being evaporated, afforded a powerful astringent gummy mass.

The five last of these experiments, have been repeated with galls and other astringents, with nearly the same result. In some; as in sumach, the acid is contained in a much larger proportion, than the resin, or earth of alum. The son of Professor Tromsdorf, it is said, has extracted,

a true tartar from the berries of this vegetable, * I think he has been mistaken, for a precipitate takes place, upon the addition of an alkali, and the berries always blacken a solution of vitriol.

To succeed in precipitating the alum, formed by adding the vitriolic acid, to the earth precipitated from vegetable astringents, with a solution of borax, great accuracy is necessary. It must contain a *certain* proportion of acid, or the precipitate will not take place. This observation, I thought necessary, for the failure of the experiment, tho' fallacious, might be offered as an objection to the theory I have laid down.



REMARKS ON THE EXPERIMENTS.

From the first of these experiments, it appears, that the juice of the Persimmon, contains the same acid, as all astringent vegetables; and from the second, we find it may be employed, as a nice test, for detecting the presence of iron, in mineral waters. In the third, it decomposed the iron, separating its principle of inflammability. In the fifth, we find a large quantity, of a transparent, brown, astringent gummy substance produced, which from some of the succeeding experiments, appears to be a gum-resin, with a proportion of excrementitious matter. The resin is a mild substance, generally containing a small proportion of the acid, and may be separated from the gum, by precipitating the basis of the astringent, by the vegeta-

* *Keir's Chemical Dictionary*, article, *vegetable acids*.

ble or volatile alkali, filtering the solution, and adding the marine or vitriolic acids. The gum is composed of the gallic acid, and the astringent basis, which is earth of alum.

The property of forming a saline gum, with the earth of alum, is not peculiar to the gallic acid. The distilled acid of sugar, according to Schrickel, and the acid of tartar, have the same effect on that earth. * A gum resin appears to exist in almost every vegetable, which has the property of striking black, with the solutions of iron, differing in the degree of solubility, in different menstrua, and in the proportion of gum and resin. It constitutes the astringent and bitter quality in peruvian bark, it may be extracted from the leaves and bark of the Persimmon, galls yield it to a watery menstruum, in the proportion of four drachms to the ounce, and it may be obtained, in considerable quantities, from the common pig-nut.

Morveau supposes the acid in astringents, is formed of this resin and pure air. The twelfth experiment clearly confutes this opinion, for the resin is there seen, in large transparent globules, when the iron, the ponderous earth, and the mercury were precipitated by the acid.

To succeed in this experiment, with galls, and other astringents, it is necessary to have a strong infusion of them, for it does not take place, after the resin has been

* Keir's Chemical Dictionary, article, acid of tartar and sugar. *The acid of sorrel and the phosphoric acid likewise form astringent gums with the earth of alum.* ibid author.

extracted by one or two infusions, altho' the astringency remains.

The precipitate formed, by adding the alkalies, to vegetable astringents, has been mistaken by some authors for the astringent principle. In Keir's chemical Dictionary, and in the last edition of the Encyclopædia Britannica, a number of observations may be seen, relating to this principle. It is there said, when redissolved in water, it blackened a solution of vitriol but faintly, and in no other manner, that what arose, from a small quantity of acid remaining, which is proved it contains by distilling it. The author of these observations has been mistaken, and it is not a difficult matter, to point out in what manner he has been deceived. The astringent taste arose from a quantity of acid, which he acknowledges it contains; its solubility in water, arose from the same cause, for after it is several times washed, and the water filtered, it does not blacken a solution of vitriol, but when diffused in water, and added to a solution of that salt, the color is immediately changed, for its solubility in water, like alum and the calcareous phosphat of urine, is owing to a superabundant acid.

When spread with a feather, over an ancient, decayed writing, it restored the legibility of the letters. Various methods have been recommended, by different authors, for this purpose; among others, the distilled liquor of galls, in Caneparius's collection de atramentis, and the phlogisticated alkali, by Dr. Blagden, in the Philosophical transactions, for the year 1787. The unripe juice of the Persim-

mon, possesses two advantages over these fluids; it is a more powerful test for detecting the presence of iron, and forms a gummy resinous coat over the letters, defending them for ever, against the action of air and moisture.

The matter formed by the junction of the astringent juice and steel filings, and the precipitated fæcula of green vitriol, possess the same properties.

The twelfth, and following experiments, naturally lead us to say a few words, on the changes which take place, in the precipitates of iron, by the vegetable astringents.

On this subject, Messieurs Macquer, Monnet, Gianotti and the academicians of Dijon, have been particularly engaged. The two former, and the greater part of chemists, consider the precipitate of ink, to be united with a principle in the gall-nut, in an oily state. Mr. Gianotti thought, that the iron was united with the astringent principle; and that it was in the state of a neutral salt. The gentlemen of the academy of Dijon, suppose the astringents direct their action to the vitriolic acid, and precipitate the iron pure.

My experiments have induced me, to draw a different conclusion, from those gentlemen. I have clearly proved, that a neutral salt exists readily formed in astringent vegetables, composed of a peculiar acid and the earth of alum, independent of a resin, which most of them contain.

In the making of ink then, a double elective attraction takes place; the gallic acid unites with the iron of the green vitriol, while the vitriolic acid unites with the earth

of alum. In an acid solution of green vitriol, no precipitate happens, because the vitriolic acid dissolves the iron, as fast as it is precipitated ; but, if a sufficient quantity of an alkali is added, to saturate the vitriolic acid, the precipitate remains suspended in the liquor ; still continue to add the alkali, and you saturate both the gallic and vitriolic acid, and the iron is precipitated, of a dirty brown color.

This theory points out the necessity of having a vitriol, exactly saturated with acid, in the making of ink ; the propriety of adding a small quantity of the vegetable alkali or steel filings, to the common ink powder of the shops, and the improper practice which some people have, of using vinegar as a menstruum, to extract its virtues.

It shows the propriety of Mr. Clegg's proposal, for employing the vegetable alkali, as a substitute for verdigrise in the black dye, for which he received a silver medal and ten guineas, from a society instituted in London, for the encouragement of arts and manufactures, in the year 1783.

It accounts for the phænomena, which happened in a number of experiments, made by Drs. Skeete and Irwin, in which magnesia, lime, chalk and the alkalies were triturated with peruvian bark, and added to a solution of green vitriol ; and which Irwin accounted for, by supposing the presence of fixed air.

The fallacy, of triturating astringent gum resins, with different substances, and adding them to a solution of green vitriol, and making the intensity of the color struck, a proof of the strength of the solvent power, is here pointed out.

It explains the reason, why in the precipitates of iron

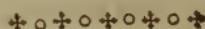
by the nut-gall, the coalition of particles is successive, and remains suspended in the fluid, and why in the *uva ursi*, the pig-nut, and the Persimmon, they concrete together, in large particles, and fall to the bottom of the vessel. In the first case, the resin being contained in a small quantity, and united to a portion of the acid, is readily soluble in water; in the second case, the resin is contained in a large proportion, and is insoluble in water.

It likewise explains to us the cause of the increased blackness of ink, in the common practice which school boys have of adding chalk, lime, &c. to that fluid.

The doctrine of astringents, serves as a key to many of the experiments of Dr. Percival, and accounts for the manner in which acids neutralize astringents; by destroying the affinity between the gallic acid, and the earth of alum.

In short, it simplifies the *Materia Medica*, it is an interesting addition to chemistry, and in future it is probable, the whole catalogue of astringents will yield to one or two of the most powerful, and the author queries, whether even the peruvian bark, will not give place, to the more powerful combination, of galls and gentian, or the Persimmon and centaury.

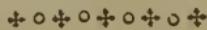
The acid of galls, forming an ink with green vitriol, may be offered as an objection to this theory, and it may be asked, why does not the vitriolic acid, in this case, dissolve the iron? The answer to this question is easy, the vitriolic acid is too weak to act on the iron, and an ink made in this manner, though at first of a deep black color, yet is not durable.



PHARMACEUTICAL TREATMENT OF THE PERSIMMON.

The unripe fruit is to be gathered, in the month of August or September, split into pieces, dried in the sun, and reduced to an impalpable powder. The juice may be obtained by pressure, in an apparatus suited to the purpose, mixed with equal quantities of water, and kept in vessels closely stopped. After the juice has been obtained, the part which remains may be dried, and used in the same manner, as the unripe fruit.

To obtain the gum resin, we insipitate the unripe juice in the sun, in wooden, or earthen vessels. The gum, if not thoroughly dried, cannot be pulverized, is malleable, and cannot be made into pills. When well dried, it is as brittle as glass, and may be used in powder, in pills, or in tincture. The best menstruum, to extract its virtues, is common-spirit.



OF THE USE OF THE PERSIMMON IN MEDICINE.

IN THE INTERMITTING FEVER.

Without entering into a disquisition, concerning the proximate cause, of an intermitting fever, suffice it to say, simple astringents, or astringents combined with bitters, are the remedies generally used, in the cure of the disease.

Galls, gum kino, oak bark, and the roots of caryophyllata have all been employed with success.

About the beginning of this century, says Dr. Cullen, the galls had got a reputation for the cure of intermittents; and it was pointed out as a proper object of attention to the Academy of Sciences, who accordingly appointed Mr. Poupart to inquire into the matter. His report amounts to this, that in many cases the galls cured the intermittents; but that they failed also in many cases, in which the peruvian bark proved successful.

This, with due deference to superior authority, cannot invalidate the efficacy of astringents, in intermitting fevers. How often does the bark succeed, when mixed with wine, or when joined with aromatics, or saline stimulants, when bark itself had no effect? How frequently does it succeed after bleeding, when pounds of it had been taken before to no purpose? How often do mild bitters succeed, when the whole catalogue of the more powerful, have been employed with no advantage? *

* Those who doubt these facts, we would refer to Hoffman, Home, Webster, Hunter, Langrish, Rush and Gardiner.

Dr. McCausland, when stationed at Niagara, cured three hundred intermittents, by tartar emetic alone*. Dr. Heberden informed Sir George Baker, that with two drachms of the powder of myrrh, he relieved a patient from an ague, which resisted the power of the bark, though taken in very large quantities†. Dr. Petrie in a letter to the same, says, that the powder of bay leaves, were efficacious in many cases of an intermittent, in which the peruvian bark, produced not the least effect‡. A very striking instance of the efficacy of mild bitters, over the more powerful, happened in an obstinate intermittent,

* Medical Commentaries vol. 8.

† Transactions of the College of Physicians of London, vol. 3.

‡ Ibid.

The general effects of astringents, are to increase the force of cohesion of the human body, to diminish irritability, to diminish the capacity of the containing vessels, and to increase the tonic powers of the system*.

From this general view it is evident, in what manner they are adapted to the cure of intermittents. Their tonic power may be increased, by joining them with simple bitters, or with bitters and aromatics. In time of war, from principles of œconomy, or from necessity, we may be forced to dispense with peruvian bark ; in these circumstances, the powder of the Persimmon combined with centaury, or with calamus aromaticus, will answer every purpose of the above remedy.

The active principles of the bark, consist in a gum and resin, or in an astringent and bitter ; in the combination above mentioned, these principles are united ; those who

which broke out at the Illinois, in which pounds of the bark were administered with no good effect ; when recourse was had to the bark of the willow tree, which subdued the disease in every instance. These medicines possess no specific power, the bark or any other astringent and bitter, given in small doses, or after proper evacuations, would have been equally efficacious. The reason the bark failed—the reason it still continues to fail in many cases, is, that it is not accommodated to the state of excitability of the system. This GRAND PRINCIPLE, THIS SUBLIME and LUMINOUS TRUTH, enables us not only to account for the failure of the bark, but for the contradictory reports, given of the same remedy by different practitioners. Diseases may be cured in both ways, but the one is like sailing by the tedious and uncertain direction of the stars ; the other, by the unerring guide of the compass.

* *Duncan's Therapeutics.*

object to it as being inferior in virtue, to that made in the laboratory of nature, might as well object to a combination of vitriolic acid and mineral alkali, being inferior as a purge to Glauber's salt.

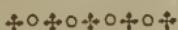
The bark of the tree, has been used with success in this disease; and it was once said, the peruvian bark was obtained, from the Persimmon tree of New Spain *.



IN THE PILES.

When the hemorrhoidal flux verges to excess, or when it depends upon a prolapsus ani, astringents both internally and externally, may be properly and safely employed. †

There are three methods of using the Persimmon in this disease; the simple juice may be applied to the part affected, or it may be mixed with eight times its quantity of hogs lard, or an ointment may be made of the juice, hogs lard, sugar of lead and opium. The second application is not only the most elegant, but the most useful, as it is free from all particles, which from their mechanical stimulus are apt to irritate. Experience has ascertained this composition, to be as useful as any, in the cure of the disease.



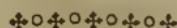
IN THE MENORRHAGIA, OR IMMODERATE FLOW OF THE MENSES.

When this disease depends upon a laxity of the uterine

* *Lawson's natural history of North Carolina.*

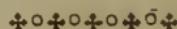
† *Cullen's first lines.*

vessels, tonics and astringents, are the remedies particularly indicated. The pulvis chalybis and peruvian bark, are the preparations generally employed. Alum when given alone, or joined with the bark, has been frequently used with success ; and if we may reason from analogy, the Persimmon, as containing a salt of greater astringency, would be equally useful.



IN THE LEUCORRHEA.

The Leucorrhea, Fluor Albus or Whites, as depending upon the same cause, as the Hemorrhagia Uteri, is to be cured in the same manner, with less reserve however in the use of astringents.



IN THE DYSENTERY.

In the latter end of the Dysentery, or in the Diarrhæa, which succeeds this disease, the ripe fruit dried, or the powder of the unripe fruit, or the bark of the root of the tree, have been employed with success, when other remedies failed.

The Indians make a paste, of the ripe fruit, which they bake into loaves, of the thickness of a mans finger, and of the consistence of a dried pear, which they use as a sovereign remedy in this disease. *

* Charlevoix, page 223. vol. 2nd. He speaks of the Persimmon tree, by the name of Piakimine, which it is called in the Indian language.

The revd. Dr. Wilson, of Lewis-town in the state of Delaware, says, the bark of the root of the tree, when given in wine is a specific.



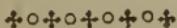
IN THE DIARRHÆA.

When this disease depends upon an increased excitability of the intestines from debility, the Persimmon is equally useful as in the Dysentery.



DIABETES.

We have the authority of Dr. Mead for using alum in this disease, altho' we are told by Dr. Cullen, the serum aluminosum has been given without success. Probably, by not being administered in sufficient quantities, and not continued for a sufficient length of time. We are guided by the light of analogy, when we would recommend a trial of one of the most powerful of the vegetable astringents in this disease.



IN THE GONORRHÆA.

The Gonorrhœa consists in an excess, or deficiency of action, in the secretory vessels of the glands of the urethra. The increased secretion of mucus is the effect, not the cause of the disease.

This theory accounts for the various success attending the use of different injections, since first introduced into practice.

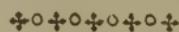
In the asthenic gonorrhœa, the Persimmon juice diluted with water, makes a valuable injection.

Some practitioners have attempted to abolish the use of these applications, and the shortness of time they remain in the urethra, has been offered as an argument against their use. Would not a bougie, made by inspissating the unripe juice on a composition of oil, wax and resin, rolled to the size of the urethra, and wore as bougies generally are, obviate this objection?



IN THE CYNANCHE TONSILLARIS.

Alum combined with oak bark, Dr. Cullen says, is a useful gargle in the Cynanche Tonsillaris, and may be used in cases of spongy swelled gums and loose teeth, from scurvy and other causes. The juice of the Persimmon, being of equal efficacy with these remedies in other diseases, must be equally so in this.



IN THE GRAVEL.

The action of astringents, in relieving the symptoms which attend the presence of a stone in the urinary passages, is a subject which has puzzled the ingenuity of ancient, as well as modern physicians. Dr. Cullen supposes they act, by absorbing the acid in the stomach, this great man, has the modesty to offer this opinion, only as a conjecture; he is induced to think so, from the medicines which are the most powerful in relieving the symptoms of a calculus, being a variety of alkalines.

In opposition to this it may be said, the urine always contains a superabundant acid, which keeps the calcareous matter dissolved ; consequently, whatever tends to rid the urine, of this excess of acid, favours the deposition of the calcareous matter. It may likewise be said, the astringent matter enters the course of circulation, and dissolves the stone.

Another objection to the opinion of Dr. Cullen, is, that all stones taken from the bladder, are not composed of the same principles ; some containing an acid, others being evaporable by heat, while others are converted into quick lime. *

To ascertain whether the astringent matter, was taken into the course of circulation, or into the bladder unaltered, I swallowed six ounces of a strong infusion of the Persimmon gum diluted with half a pint of water ; and after frequent micturition at different intervals, could not discover it in the urine by the addition of green vitriol.

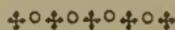
At the same time I opened a vein in the arm, and could not discover it in the serum, by the same test.

To see the effect of a concentrated astringent, on the calculus, I put one scruple of a stone taken from the bladder of a horse, reduced into an impalpable powder, into Persimmon juice, one scruple into water, and another into recent urine, and after the mixtures had stood twenty four hours, I filtered the water, and having dried the powder,

* *Percival's Essays* vol. 1. And *Transactions of the Royal Society of Edinburgh* vol. 3.

of each mixture separately, found it had lost none of its weight.

In this disease the Persimmon may be used in powder, in pills, or infusion.



IN CHRONIC ULCERS.

The ripe fruit applied to an old malignant ulcer, has been found to be an efficacious remedy, and is said to cause exquisite pain. *

The efficacy probably arises, from its antiseptic quality, and from the inflammation which it excites.

To produce an action different from the morbid one, which prevails in ulcers, by the exhibition, or abstraction of stimulants, appears from many striking facts, to be the indication to be answered.

Boerhaave, before he began the study of Physic, cured an ulcer on his leg by the application of *salt* and *urine*, which resisted the remedies of the most celebrated Physicians, for five years. †

I have seen bleeding and a low diet cure, or at least, put a venereal ulcer of the leg in a proper disposition to heal, which baffled the power of mercury, bark, wine, wort, generous diet, and many other famous tonics and stimulants. Sir John Pringle, mentions a fact nearly similar to this. §

* *Lawson's natural history of North Carolina.*

† *Johnson's life of Boerhaave.*

‡ *Diseases of the army.*



OF THE USE OF THE PERSIMMON IN THE ARTS.

IN THE TANNING OF LEATHER.

The greater the quantity of resin contained in any vegetable astringent, the greater the ease with which leather may be impregnated with it, and its greater degree of insolubility in water afterwards, so much the more valuable is it, in this important branch of manufactures.

The use of tanning, says Dr. Macbride, is to prevent the leather from rotting, and to render it impervious to water. Any astringent vegetable substance, is powerful enough to accomplish the first purpose, but to render the leather impervious to water, requires one containing a large proportion of gummy resinous matter.

The superiority of oak bark over other astringents, is owing to this property. The famous essence of this substance, is no more than an extract made by infusion, and was first proposed as a substitute for oak bark, in a memoir delivered to the Bath Society, in the year 1773.

The unripe juice of the Persimmon, provided it could be obtained in sufficient quantities, and for a price which would not greatly enhance the value of leather, must be preferable to oak bark, for reasons evident to every chemical mind.

Allowing every tree to produce four bushels of fruit, though Mr. Bartram says, he has seen some which produce six, and suppose three hundred of these trees cultivated; the quantity of gum resin which would be produced, would

be 1800 pounds, as I have ascertained by experiment, computing six pounds to a tree. The quantity of juice would be several hundred gallons, which might be kept in barrels 'till wanted for use.

North Carolina is the only state, in which the Persimmon is cultivated; it is a common practice there to ingraft it on the apple, by which means the rapidity of its growth is greatly increased.

When we oppose the cleanliness of the process, if the Persimmon could be used, the strength of the astringent, the small number of hands required, the small capital to begin and little labour requisite to carry on the business, the trifling piece of ground which a tanyard would occupy, the value of the leather and shortness of time necessary to finish it: to the large capital at present required, the number of hands employed, the quantity of labour, the immense loads of bark, the annual expence of a horse and price of instruments to grind it, and to the length of time necessary to finish the leather, we may conclude, the experiment is well worthy the attention of some philosophical tanner.



AS AN INGREDIENT IN THE BLACK DYE.

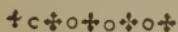
The black dye in common use, is no more than an ink, made by adding a vegetable astringent to a solution of green vitriol, altho' realgar, antimony, litharge, arsenic, orpiment and other substances have been added to the ingredients.

In the Swedish transactions for the year 1753, a fine black is said to be dyed, with the leaves of the *uva ursi*,

the black matter concretes together in large particles, which is supposed to be of great advantage to the black dye, as the largeness of the colouring particles, which concrete in the pores of the cloth, may render them more fixed, consequently, less of the colouring matter is wasted in the liquor. To this cause, says Dr. Lewis, may be attributed a quality of the *uva ursi* dye, mentioned by the Swedish author, that the cloth is clearer, than after the other black dyes, or requires less washing to free it from the loose color.

The juice of the Persimmon, precipitates iron in the same manner as the *uva ursi*, in large particles, which fall to the bottom of the vessel. I have dyed silk with an ink made of this substance, which was as black, and bore washing as well, as that dyed with galls, logwood, and fifty other ingredients.

It is astonishing to think, an exorbitant price is still paid for galls and logwood, when bushels of a substitute superior to either, may be had for the trouble of carrying them away.



IN THE MAKING OF INK.

The great defect in an ink, made from the juice of the Persimmon, is, that the precipitated iron, concretes together in large particles, and falls to the bottom of the vessel; this takes place in a greater or less degree, in every precipitate of iron, by a vegetable astringent. In some inks this circumstance may be prevented by the addition of gum arabic, and the coloring matter kept suspended in

the fluid; I have attempted it in vain, in ink made from the Persimmon, the letters always appearing as if written with charcoal diffused in water. An ink has likewise been made from the precipitated iron mixed with water, and kept suspended by the addition of gum arabic; when made in this manner, tho' it is durable, yet the letters may be washed off from the paper as easily as if written with any black powder diffused in water.

In the latter end of October, and in November, the astringent gum of the Persimmon, is converted into a sweet nutritious substance, which remains on the trees 'till January, and serves as food to squirrels, rabbits, racoons, and other animals.

The manner in which this change is produced, would lead to an inquiry, as curious as it would be useful. It appears to be a process, analogous to a mortification in the extremities of the human body, and brought on by the same cause. An extinction of life, from a languid circulation, caused by the debilitating power of cold. In what manner this quality acts, in producing a decomposition, is difficult to determine: the constituent principles appear not to be changed, they are only modified; the gum resin is principally composed of acid, oil, earth and water: the ripe fruit contains the same principles, and even when changed into a vinous liquor and distilled, the composition is still acid, oil, and water*. Here we must rest satisfi-

* *The composition of spirit of wine, is a subject which has engaged the attention of many celebrated Chemists, among whom Cartheuser, Macquer, Stahl, Boerhaave and Bucquet stand foremost. The two former, consider it as a compound*

ed with the fact, for it is not the business of Chemistry, to wander in the boundless regions of conjecture. Perhaps some future experiments, may throw light on this mysterious process, which at present only proves, that nature herself is a great Chemist.



TO MAKE SPIRIT OF THE PERSIMMON.

For this purpose, a certain quantity of water is to be added to the Persimmon when ripe, and the whole put into a proper vessel to which a certain quantity of yeast is to be added, to promote a fermentation. Every bushel

of phlogiston and water, while the latter, think it is composed, of acid, water, and an attenuated oil. Perhaps a gleam of light may be thrown upon the subject, when we observe, that spirit of wine may be produced from animal, as well as vegetable substances. A fact not noticed in systems of Chemistry!

The Tartars prepare a wine, called Koumiss, from the milk of Mares, Camels, Ewes, and Reindeer, which is partly of an animal nature, and another called Airn, from the milk of Cows. They likewise produce an inebriating liquor, from fish and water, putrefying in holes dug in the earth.† The Chinese prepare a wine from Lamb, and produce a strong spirit from the flesh of Sheep.‡ The Swedes distil a low priced brandy, from rye and large black ants, found in small round holes, at the bottom of the Fir-tree.§*

The ants yield to a chemical analysis, acid, oil, and resin. These acts in my opinion, not only throw light on the composition of spirit of wine, but are an interesting addition to our stock of knowledge, on putrefaction and fermentation.

* *Tooke's history of Russia, and Transactions of the Royal Society of Edinburgh, vol. 1.*

† *Macbride's Essays.*

‡ *Encyclopædia Britannica, article China.*
Consett's tour through Sweden.

of fruit treated in this manner, will yield one gallon of spirit, of an agreeable flavour. If beer is prefered to spirit, the fruit is boiled in water, which is afterwards strained, and set to ferment; hops are then added to prevent the fermentation from proceeding too far, and it is bottled for use.

Those who would wish to collect large quantities of the fruit for distillation, may consult a memoir published by Mr. Bartram, in the first volume of the American Philosophical Transactions.



TO MAKE PERSIMMON BREAD.

When freed from the stones, they are to be mixed with flour as potatoes generally are and baked in the same manner. Bread when made in this way, is not only very nutritious, but has the advantage of œconomy to recommend it.

F I N I S.

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